



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/888,256	06/22/2001	Glen E. Howard	004978 USA/ETEC/RWM	8744

32588 7590 09/11/2003

APPLIED MATERIALS, INC.
2881 SCOTT BLVD. M/S 2061
SANTA CLARA, CA 95050

EXAMINER

PHAM, HAI CHI

ART UNIT

PAPER NUMBER

2861

DATE MAILED: 09/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/888,256

Applicant(s)

HOWARD ET AL.

Examiner

Hai C Pham

Art Unit

2861

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,5-10,14-20,22-32 and 34-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19,20,22,31,32,36-38,43 and 44 is/are rejected.
- 7) ☒ Claim(s) 1,5-10,14-18,23-30,34,35 and 39-42 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Claim Objections

1. Claims 41-42 are objected to because of the following informalities:

Claim 41:

- Line 1, "the beam-receiving portion" should read --a beam-receiving portion-- since it lacks antecedent basis.

Claim 42:

- Line 1, "the beam-receiving portion" should read --a beam-receiving portion-- since it lacks antecedent basis.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000.

Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

3. Claim 19 is rejected under 35 U.S.C. 102(b) as being anticipated by Davis (U.S. 5,942,834).

Davis discloses a method for generating electrons from an electron source used in a thermionic electric converter, the electron source comprising an anode (206), a cathode (220) having an electron emitting portion, the method comprising negatively biasing the cathode relative to the anode (col. 4, lines 55-67), and heating the cathode at least about 1800 Kelvin by directing an electromagnetic radiation beam onto the cathode (the cathode being heated by a heat source, which can be a laser) (see col. 6, lines 41-43) (Davis indicates that the cathode would be normally held at 1800 degrees Kelvin) (col. 2, lines 6-8).

4. Claim 43 is rejected under 35 U.S.C. 102(e) as being anticipated by Mankos et al. (U.S. 6,215,128 B1).

Mankos et al. discloses a scanning lithographic system using an electron source for generating electron beam, the electron source comprising an anode (extraction electrode 42), and a cathode (photoemission cathode 32) having an electron emitting portion (photoemission layer 34) and a beam receiving portion (from the back side of the photoemission layer 34), which includes metal (col. 3, lines 65-67), an electromagnetic radiation source (laser/UVI light source 14) adapted to generate an electromagnetic

radiation beam (16) to heat the cathode, a lens (28) adapted to direct the electromagnetic radiation beam onto the beam-receiving portion of the cathode, whereby electrons are emitted from the electron emitting portion (Fig. 1).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Davis in view of Nayama et al. (JP 5-159694).

Davis discloses all the basic limitations of the claimed invention except for the detection of a radiation reflected from the cathode for determining a property of the cathode.

Nayama et al. discloses a laser heater controller for the electron gun cathode (1) comprising a laser oscillator (6) radiating a laser beam (7) to heat the cathode of the electron gun through an incident optical system (8), a temperature measuring instrument (13) for detecting the temperature/property of the cathode by detecting the radiation light reflected from the cathode, and a temperature controller (14) for monitoring and stabilizing the heating of the cathode.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the device of Davis with the aforementioned teaching of

Nayama et al. The motivation for doing so would have been to produce a stable output of electron beams as suggested by Nayama et al.

7. Claims 36-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mankos et al. in view of Nayama et al.

Mankos et al. discloses all the basic limitations of the claimed invention except for the use of a thermostat for determining the temperature of the cathode for adjusting the amount of heat being applied to the cathode.

Nayama et al. discloses a laser heater controller for the electron gun cathode (1) comprising a laser oscillator (6) radiating a laser beam (7) to heat the cathode of the electron gun through an incident optical system (8), a temperature measuring instrument (13) for detecting the temperature of the cathode by detecting the radiation light reflected from the cathode, and a temperature controller (14) for monitoring and stabilizing the heating of the cathode.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide the temperature controlling system as taught by Nayama et al. in the device of Mankos et al. The motivation for doing so would have been to produce a stable output of electron beams as suggested by Nayama et al.

8. Claims 19-20, 31-32, 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mankos et al. in view of Davis.

Mankos et al. discloses all the basic limitations of the claimed invention except for the cathode being heated at 1800 Kelvin.

Davis discloses an electron gun having a photocathode (220) held at a negative potential relative to the anode (206), being heated at 1800 degrees Kelvin under the direct radiation of a laser source for generating an electron beam.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to heat the photocathode in the device of Mankos et al. at 1800 degrees Kelvin as taught by Davis. The motivation for doing so would have been to provide an optimum condition under which the electron source efficiently generates the electron beam.

9. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mankos et al. in view of Allen et al. (U.S. 6,448,568 B1).

Mankos et al. discloses all the basic limitations of the claimed invention except for the electron beam modulator.

Allen et al. discloses a lithography apparatus using an electron gun for generating an electron beam, the electron gun including a photocathode (424) being heated by irradiation from a laser source (110), and generating an electron beam, the electron beam being modulated by using a modulator (120).

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to provide a modulator as taught by Allen et al. in the device of Mankos et al. The motivation for doing so would have been to control the intensity as well as the precise scanning of the electron beam over the surface of the workspace.

Allowable Subject Matter

10. Claims 1, 5-10, 14-18, 23-30, 34-35 are allowed.
11. Claims 39-42 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
12. The following is a statement of reasons for the indication of allowable subject matter: the primary reason for the indication of the allowability of the claimed invention is the inclusion of the limitations related to the structure of the cathode and the focusing lens, namely "the beam-receiving portion of the cathode having a substantially concave surface" and the "lens adapted to direct the electromagnetic radiation beam onto the substantially concave surface of the beam-receiving portion of the cathode, in the combination as currently claimed in each of the claims 1, 5-10, 14-18, 41, 42, and which are not found taught or fairly suggested by the prior arts made of record, considered alone or in combination.

The primary reason for the indication of the allowability of the claimed invention, with respect to claims 23-30, 34-35, 39-40, is the inclusion of "the lens being supported by a rod that is substantially parallel to the cathode axis and terminates in the electron emitting portion of the cathode", in the combination as currently claimed, that is not found taught or fairly suggested by the prior arts made of record, considered alone or in combination.

Response to Arguments

13. Applicant's arguments with respect to claims 19-20, 22, 31-32, 36-38, 43-44 have been considered but are moot in view of the new grounds of rejection presented in this Office action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai C Pham whose telephone number is (703) 308-1281. The examiner can normally be reached on T-F (8:30-5:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin R. Fuller can be reached on (703) 308-0079. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722, (703) 308-7724, (703) 308-7382, (703) 305-3431, (703) 305-3432.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



**HAI PHAM
PRIMARY EXAMINER**

August 28, 2003